KINGDOM OF SAUDI ARABIA

SAUDI ARABIAN STANDARDS ORGANIZATION

SASO

SAUDI STANDARD
DRAFT No. ٩١٢٩/٢٠٠٩

BOTTOM LOADING TANK TRUCK- INSPECTION AND PERIODIC MAINTENANCE

SAUDI ARABIAN STANDARDS ORGANIZATION

THIS DOCUMENT IS A DRAFT SAUDI STANDARD CIRCULATED FOR COMMENT. IT IS, THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS A SAUDI STANDARD UNTIL APPROVED BY THE BOARD OF DIRECTORS.

KR-٢٢٨٧

TABLE OF CONTENTS

- Scope .....
- Eligibility requirements
  (third party inspection contractor) .....

A. Initial inspection .....

- General vehicle inspection .....
- Internal visual inspection .....
- External visual inspection .....
- Functionality check .....
- Hydrostatic testing .....
- Tanker certification .....

B. Periodic maintenance inspection .....

C. Frequency of inspections and pm tests .....

- Appendixes.....
- Appendix ١ (piping & emergency valve configurations).....
- Appendix ٢ (tanker modifications - option i).....
- Appendix ٣ (tanker modifications - option ii) .....
- Appendix ٤ (housekeeping box details).....
- Appendix ٥ (baffle openings) .....
- Appendix ٦ (inspection certificate).....
- Appendix ٧ (external check list) .....
- Appendix ٨ (internal check list).....

BOTTOM LOADING TANK TRUCK- INSPECTION AND PERIODIC MAINTENANCE

١. SCOPE

This standard establishes the scope of work, and outlines the requirements for initial inspection and subsequent periodic maintenance inspections by qualified Inspection Personnel or alternatively by a Third Party Inspection Contractor (TPIC) on tank trucks modified to bottom loading.

٢. TPIC ELIGIBILITY REQUIREMENTS

٢,١ The TPIC shall possess demonstrable past experience in bottom loading tank truck modification, and shall be capable of providing inspection services in all of the Kingdom including remote locations.

٢,٢ The TPIC shall be approved organization familiar with the Engineering Standards, Inspection Procedures and Quality Assurance / Quality Control requirements.

٢,٣ The TPIC shall possess the necessary equipment, certified crafts men and resources for carrying out the bench tests to determine the operability of the installed components, and verifying the adequacy of the conversion work for tank trucks modified to bottom loading. The following equipment is deemed essential in carrying out the bench tests:

٢,٣,١ A bench prototype system simulating the actual loading rack connections (the loading arm coupler, the vapor hose coupler and the overfill prevention control monitor plug) at the bulk plant loading rack / tank truck interface. The bench type prototype system shall be utilized for the bottom loading tank truck fit-up check and also to verify the cross compatibility of the bottom loading fittings manufactured by different suppliers at the loading rack / tank truck interface connection. The bottom loading fittings shall comply with the SASO Specifications *.

٢,٣,٢ Equipment to detect presence of hydrocarbon vapors inside the tank truck (e.g. an Explosimeter or Gas Snubber) . All vapor detection equipment shall be calibrated according to the manufacturer recommendations

٢,٣,٣ Equipment to hydro-test tank truck shell for leaks and pressure testing, testing of pressure / vacuum vents for operability and verification of pressure / vacuum setting.

٢,٣,٤ Equipment for testing the manhole cover for structural integrity, leaks, and spring loaded fill cap for pressure relieving and emergency venting.

٢,٣,٥ Testing equipment (Scully Tester or equivalent) to verify the operability of the overfill prevention and tank truck grounding system.

---

* To follow API RP ١٠٠٤ Specifications (American Petroleum Institute) until the approval of Saudi standards

٣. INITIAL INSPECTION

٣,١ Introduction

Initial inspection of a tank truck modified to bottom loading shall be carried out by TPIC. The TPIC shall have the responsibility to validate and certify the modification work to comply with the requirements.

The TPIC shall ensure the following are in place:

- Suitable test area / facilities
- Suitable pressure measuring devices
- Suitable calibration methods
- Adequate hydrostatic test equipment
- Adequate water pumping equipment
- Procedure for entry into confined spaces
- Procedures for testing, certification and reporting

٣,٢ General Vehicle Inspection

The TPIC shall perform General Vehicle Inspection as follows:

٣,٢,١ Ensure that the Saudi Arab Government Inspection documents are available and in order, and the vehicle has a valid Government Inspection sticker in place.

٣,٢,٢ Engine hood latch is functional and secured in place.

٣,٢,٣ Batteries are secured in a covered box and electrically insulated.

٣,٢,٤ Air brake hoses are in good condition, properly connected and secured, and free of leaks. Primary brakes and parking brakes are functional.

٣,٢,٥ Electrical circuit wiring is free of damage and properly secured.

٣,٢,٦ Head lights, brake lights, and signal lights are operational and free of damage. Vehicle horns are operational.

٣,٢,٧ Fifth wheel connection plate is free of rust, corrosion, and without deformations / warping damage. Connection bolts are intact and free of rust and damage.

٣,٢,٨ The vehicle exhaust system is in good condition and discharges at ground level.

٣,٢,٩ Chassis structural frame, spring leaves and shock absorbers are free of damage, operational, and secured properly.

٣,٢,١٠ Vehicle tires are in good condition and with a minimum of ٢/٣٢ inch tread across the full width. Wheel mounting bolts are intact and without rust or corrosion damage. Wheel frame is free of broken wells or damage. Spare tire is secured adequately.

٣,٢,١١ Windshield is without cracks and in good condition. Windshield wipers are functional and without wear damage.

٣,٢,١٢ Side view mirrors and rear view mirror (inside the drivers cab) are without damage and mirror adjustment mechanisms are functional.

٣,٢,١٣ Fuel tanks are free of damage and secured adequately to the tank truck support frame. Auxiliary fuel tank (if provided) is equipped with a pressure relief device.

٣,٢,١٤ Seat belts in drivers cabin are without damage, and in good working condition.

٣,٢,١٥ Toolbox for minor repairs is secured properly in an accessible location, and is labeled.

٣,٢,١٦ Tank truck mounted portable fire extinguishers are in operable condition, easily accessible, inspected every ٤ months, tagged, sealed and not wired on. Fire extinguisher shall be comply with SASO standards.

٣,٢,١٧ Tank truck top access ladder is in good condition and adequately secured to the tank shell structure. Ladder rungs, frame and support clips are free of damage.

٣,٢,١٨ Tank truck overturn protection / containment curb on tank top is in good condition and free of damage. Walkway is provided with a skid resistant surface.

٣,٣ Internal Visual Inspection (every three years)

The internal visual inspection requires entry into the tank truck shell by the inspector and shall be performed prior to the installation of bottom loading fittings on the tank shell. The tank shell shall be rendered free of any flammable, poisonous or otherwise harmful commodities including vapors. All work shall be performed in accordance with sound industry practice applicable to working in confined space.

The TPIC shall perform internal visual inspection as follows:

٣,٣,١ The integrity of the lining (for lined tank shells only). If defective areas are found in lining, these shall be removed and the shell underneath inspected for its condition.

٣,٣,٢ Corners, seams, recesses, and where structure is joined (baffles, bulk heads, etc), inspect for stains or discoloration in the parent material, blisters, separation and liner material termination (for lined tank shells only) at valves and drains.

٣,٣,٣ Inspect the tank shell interior for corrosion of the shell material, cracks in shell material, cracked welds on internal components, and deformation over support areas.

٣,٣,٤ Inspect the tank shell interior for prior repairs such as repair welds, section inlays, added structural components and patches.

٣,٣,٥ Inspect and ensure that conducting objects such as loose floats or screens are removed from the tanker shell.

٣,٣,٦ Inspect and ensure that gauging rods and other conductive devices which can act as spark promoters are removed.

٣,٣,٧ Inspect the tank shell interior for presence of un-bonded foreign objects, e.g. metal clips, brackets, plates etc., which can act as a spark promoter during product loading operation. The presence of such objects should be reported and action taken to remove these from tank shell prior to starting work on bottom loading modifications or resumption of tank truck operation.

٣,٣,٨ Welding inspection shall be based on the welding type and as per SASO Standards or international standard in case of there is no Saudi Standard. Cracks in shell seams, shell to head welds or fitting welds, if found present, shall be repaired prior to start of modification work.

٣,٣,٩ Inspect internal Tank Fittings including valves, high level sensor, vapor vent valve, internal vapor or drain line, connecting linkage between emergency valve and vapor vent (OPTION II specific), and check any other internal fittings for bolt tightness, correct alignment and other defects.

٣,٤ Baffle Requirements

The TPIC shall inspect and certify compliance with the following baffle requirements:

٣,٤,١ Anti-surge baffles, ends and divisions shall be fabricated from the same material as the tank shell and free of defects and damage. Baffles shall be installed in a vertical attitude with respect to the longitudinal axis of the cargo tank, and shall be welded to the tank shell. The thickness of the baffles shall not be less than the thickness of shell material.

٣,٤,٢ Support brackets, or any temporary hardware used for installation of baffles shall be removed from the tank shell, since these can act as spark promoters.

٣,٤,٣ The cross-sectional area of each baffle (after deducting the area of all openings) shall not be less than ٨٠٪ of the cross-sectional area of the tank (see Figure ١).

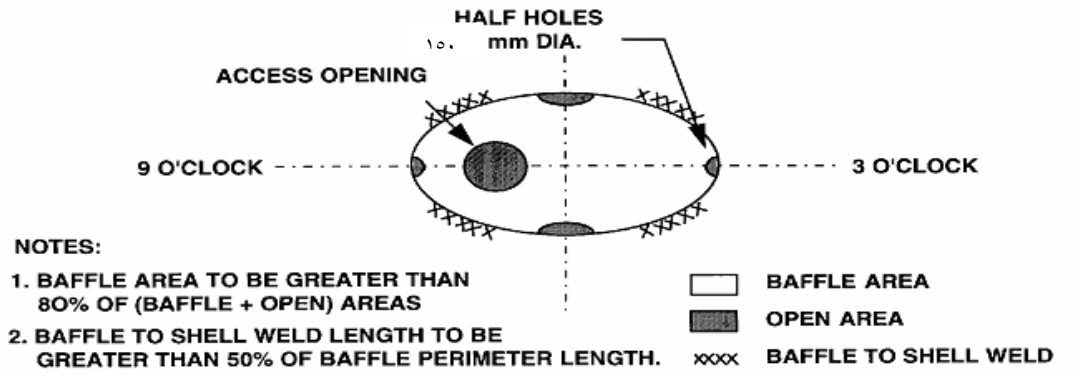

HALF HOLES
١٥٠ mm DIA.
ACCESS OPENING
9 O'CLOCK
3 O'CLOCK
NOTES:
1. BAFFLE AREA TO BE GREATER THAN 80% OF (BAFFLE + OPEN) AREAS
2. BAFFLE TO SHELL WELD LENGTH TO BE GREATER THAN 50% OF BAFFLE PERIMETER LENGTH.
BAFFLE AREA
OPEN AREA
BAFFLE TO SHELL WELD

Figure ١ - Baffle Requirements

٣,٤,٤ Baffles shall be provided with sufficiently sized openings on their vertical center-line at bottom and at top to permit flow of product and flow of product vapors between compartments (see Figure ١). The openings shall have a minimum cross sectional area of ٠,٠٥ square meters (٨٠ square inches) .

٣,٤,٥ Additional baffle half (semi-circular) holes on the horizontal centerline shall be provided to allow the drainage of trapped liquid in an overturned tank truck. The half holes shall be ١٥٠ mm diameter located on each side of the baffle (the ٣ o'clock and ٩ o'clock positions) as shown in Figure ١.

٣,٤,٦ Access opening of ٥٠٠ mm (٢٠") diameter in size (Figure ١) shall be provided close to the centerlines of baffle to provide means of access into baffled compartment for inspection and maintenance purposes.

٣,٥ External Visual Inspection

٣,٥,١ General

The TPIC shall:

٣,٥,١,١ Inspect the exposed area of shell and heads for dents, gouges, scrapes, cracks and poorly performed repairs, like patches. Cuts and gouges shall not be longer than١٠٠ mm (٤") and the material thickness underneath the damage shall not be less than the tank shell thickness. Dents with depth equal to or exceeding one tenth (١/١٠) of the greatest bridge dimension of the dent area, but in any case deeper than ٢٥ mm (١") shall be repaired.

٣,٥,١,٢ Inspect the fifth wheel plate (tractor head attachment area to the tank truck shell) for deformation or caving in of the fifth wheel plate, and loose, corroded or missing bolts.

٣,٥,١,٣ Verify that all material installed for bottom loading modification work is from an approved source and is in accordance with the approved material list of the same supplier. Mix and match of materials from different approved sources shall not be permitted.

٣,٥,٢ Items Specific to Option I Configuration (Pneumatic System)

The TPIC shall inspect and ensure:

٣,٥,٢,١ Modified tank trucks are fitted with two - ١٠١,٦ x١٠١,٦ mm (٤"x ٤") emergency valves, one emergency valve located in the vicinity of the low point of the tank shell and the other close to middle of the tank shell.

٣,٥,٢,٢ Gasket seats are free from scratches and weld spatter.

٣,٥,٢,٣ Emergency valves are installed squarely on the sump flange at the bottom of the tank shell. Welding is performed avoiding distortion. Weld encroachment does not exceed the greater of ٢٠ mm (٣/٤") or three times the material thickness.

٣,٥,٢,٤ The pneumatic operation components are installed in accordance with the supplier installation manual. Lifting of guard bar assembly (for tank trucks equipped with this feature), or loading arm connection activates the air interlock and facilitates full (not partial) and simultaneous opening of

٣,٥,٢,٥ The pneumatic air-supply lines are installed free of sharp bends and routed clear of sharp edged mountings and protrusions on the tank truck.

٣,٥,٣ Items Specific to Option II Configuration (Mechanical System)

The TPIC shall inspect and ensure:

٣,٥,٣,١ A sump mounted١٥٤,٤ x ١٠١,٦ x١٠١,٦ (٦"x٤"X٤") emergency valve is installed at the rear most bottom end of the tank shell, and is located in the vicinity of the low point of the tank shell.

٣,٥,٣,٢ Gasket seats are free from scratches and weld spatter.

٣,٥,٣,٣ Emergency valve is installed squarely on the sump flange at the bottom of the tank shell. Welding is performed avoiding distortion. Weld encroachment does not exceed the greater of ٢٠ mm (٣/٤") or three times the material thickness.

٣,٥,٣,٤ Vapor vent mounting pad is welded to the top of the tank on the centerline, directly above & parallel to the mounting sump for emergency valve.

٣,٥,٣,٥ Operating rod is properly aligned between emergency valve and vapor vent, ensuring free movement.

٣,٥,٣,٦ Length of operating rod is adjusted to provide a minimum clearance of ٢ mm at the collar of vent-valve stem with the emergency valve & vapor vent valve in closed position.

٣,٥,٣,٧ The cable path (between the emergency valve cam and the bottom operator) is straight and free of sharp radii / bends.

٣,٥,٣,٨ Operation of the mechanical bottom operator ensures full (not partial) and simultaneous opening of emergency valve and vapor vent valve.

٣,٥,٤ Bottom Loading Components Common to Both Option I & Option II

The TPIC shall inspect, ensure satisfactory installation and compliance with the following requirements:

Loading & Unloading Adapters

٣,٥,٤,١ Adapters (comply with SASO Standards*) are located at the right (curb) side of the tanker and forward of the rear axle (OPTION I Configuration) or behind the rear axle where installation at forward location is not possible (OPTION II Configuration, limited to short trucks).

٣,٥,٤,٢ Horizontal spacing of the two adapters (comply with SASO Standards*) is ٤٠٠ mm (min.) to ٤٥٠ mm (max.) between centerlines.

٣,٥,٤,٣ The face of the adapters is located at a distance of ١٥٠-mm inwards from the side of the tank truck.

٣,٥,٤,٤ The centerline height of the adapters (tank truck in unloading condition) is ٧٥٠ mm (min.) to ٨٠٠ mm (max.) from ground.

٣,٥,٥ Vapor Control System

٣,٥,٥,١ The vapor adapter is located at the right curbside of the tank truck and forward of the rear axle (OPTION I Configuration) or behind the rear axle where installation at forward location is not possible (OPTION II Configuration, limited to short trucks).

٣,٥,٥,٢ Centerline of vapor adapter is at a horizontal distance of ٣٠٠ mm (min.) to ٣٥٠ mm (max.) from the adjacent adapter, and at a height of ٢٠٠ mm from the horizontal centerline of the adapters (comply with SASO Standards*) as shown in Appendix ٤.

٣,٥,٥,٣ Face of the vapor adapter is in the same vertical plane as load / unload adapters (comply with SASO Standards*).

٣,٥,٥,٤ Vapor control piping is installed with standard piping elbow fitting. Mitered joints are not present.

٣,٥,٥,٥ Reinforcement pads are provided at penetration points for vapor line installation through the tank shell (OPTION I Configuration).

٣,٥,٦ Overfill Prevention & Grounding System

٣,٥,٦,١ The optic probe for overfill prevention is installed close to the longitudinal center of tank shell top, or alternatively fitted in the spare accessory port of the new manhole cover located close to the longitudinal center of tank shell top.

٣,٥,٦,٢ The length of the optic probe is adjusted in accordance with the calibration requirements outlined in this document.

٣,٥,٦,٣ Overfill prevention / grounding socket is installed to the right of centerline of the adapter in accordance with Appendix ٤.

٣,٥,٦,٤ Wiring and connections are made in accordance with the supplier's Installation Manual.

٣,٥,٦,٥ Wiring is enclosed in metallic conduit, routed on the outside of tank shell, and adequately supported at the tank shell.

٣,٥,٦,٦ The ground bolt is installed on the tank shell or on the chassis frame on tank trucks where chassis frame is integral with or welded to the tank shell.

٣,٥,٦,٧ The ground bolt installation surface is free from grease, paint, weld spatter and debris. The mounting hole is protected from the formation of corrosion by application of a silicone sealant or suitable material adequate for this application.

٣,٥,٦,٨ The ground bolt is wired to the designated receptacle pin in accordance with supplier's Installation Manual. Minimum wiring size is #١٠ AWG(or equivalent).

٣,٥,٧ Calibration

٣,٥,٧,١ Simulated fifth wheel height is used during calibration to account for slope of the tank truck.

---

* To follow API RP ١٠٠٤ Specifications (American Petroleum Institute) until the approval of Saudi standards

٣,٥,٧,٢ The maximum liquid level after calibration and corresponding to the new tank shell volumetric capacity is at least ٥٠ mm below the lowest point of the vapor vent.

٣,٥,٧,٣ The sensing tip of the optic probe is no more than ٢٠ mm to ٢٥ mm above the maximum liquid level corresponding to new volumetric capacity of tank shell, and at the same time below the lowest point of the vapor vent.

٣,٥,٨ MANHOLE COVER & TANK TRUCK VENTING SYSTEM

٣,٥,٨,١ Manhole cover is located along the longitudinal centerline of the tank shell in the proximity of the center of the tank shell.

٣,٥,٨,٢ The pressure / vacuum vent(s) on manhole cover have the following setting (See Note):

- ٧٠ mb (١ psig) for pressure
- ٢٠ mb (٠,٣ psig) for vacuum

The vent is tested for functionality under simulated pressure and vacuum setting.

Note: Different manufacturers may have variations to these settings. It is deemed mandatory to check the supplier manuals and check the settings accordingly.

٣,٥,٨,٣ The pressure actuated fill cap of the manhole cover is set to open at a pressure of ٢١٠ mb (٣ psig), and tested accordingly for functionality under simulated pressure of ٢١٠ mb (٣ psig).

٣,٥,٨,٤ Manhole enclosure box (if provided) has meshed openings to allow for operation of pressure / vacuum vent and manhole fill cap for emergency venting.

٣,٥,٩ Piping Work

٣,٥,٩,١ Piping is cleared of debris and all foreign materials prior to installation of bottom loading fittings.

٣,٥,٩,٢ Piping is supported structurally by the tank shell structure. The tank shell structure is reinforced at support locations.

٣,٥,٩,٣ No mitered bends are present in the piping. Standard elbow fittings are used at bends and change in path of the piping.

٣,٥,٩,٤ Piping from emergency valve(s) to loading Adapters is provided with nominal slope (٥ degrees to Horizontal) to facilitate the flow of product to the adapter(s).

٣,٥,٩,٥ Undercarriage piping is pressure tested to ٧,٧٥ bar (١١٢ psig) as SASO Standards*. Vapor piping is tested to ٧٠ mb (١ psig) minimum.

---

* To follow API RP ١٠٠٤ Specifications (American Petroleum Institute) until the approval of Saudi standards

٣,٥,١٠ WELDING

٣,٥,١٠,١ Inspect all welding for bottom loading fittings and piping for cracks and defects in workmanship. Weld encroachments less than ٢٠ mm (¾ “) shall not be permitted.

٣,٥,١٠,٢ Ensure that the welding work is carried out in accordance with American Welding Society (AWS) or equivalent industry standards and practices.

٣,٥,١١ Housekeeping Box

٣,٥,١١,١ The bottom loading adapters, vapor adapter and overfill prevention / grounding socket fittings are housed in a lockable housekeeping box constructed of steel (Appendix ٤).

٣,٥,١١,٢ Protective caps are provided for vapor adapter, loading / unloading adapters, and overfill prevention / grounding socket.

٣,٥,١١,٣ Minimum vertical clearance of ٥٠٠ mm (tanker in unloading condition) is provided from the underside of the housekeeping box to Grade.

٣,٥,١١,٤ Minimum clearance of ٧٥ mm is provided between the edge of housekeeping box and the rear tire fender for the housekeeping box installations at the rear of the tank truck (OPTION II Configuration).

٣,٥,١١,٥ No part of the housekeeping box interferes with or prevents connection to the loading / unloading adapters, vapor adapter, and overfill prevention receptacle.

٣,٥,١١,٦ The bottom operator (OPTION II Configuration) in its installed position does not interfere with other bottom loading fitting connections in the housekeeping box.

٣,٦ Functionality Checks

The TPIC shall perform the functionality tests for the installed bottom loading fittings and equipment on the modified tank truck. The functionality tests shall include but not be limited to verifying the operability, fit up check, cross compatibility (mix and match of fittings provided by different suppliers), and leak / pressure testing of fittings(comply with SASO Standards*). The bottom loading fittings (comply with SASO Standards*) and the required functionality tests are summarized in the following table:

* To follow API RP ١٠٠٤ Specifications (American Petroleum Institute) until the approval of Saudi standards

Fitting description	Functionality test
[١] Load / Unload Adapters(comply with SASO Standards*)	Opening & Closure (Operability), Loading Arm coupler fit check (compatibility), Leak test
[٢]Vapor Adapter	Opening & Closure (Operability), Vapor Hose Coupler fit check (compatibility), Leak test
Vapor Vent Valve	Opening & Closure
Emergency Valve(s)	Opening & Closure, Leak test
[٣]Overfill Prevention / Grounding	Operability and compatibility with loading rack Control Monitor
Brake Interlock System	Activation of brake interlock valve by lifting of guard bar or mating of loading arm coupler
Pressure / Vacuum Vent	Pressure / Vacuum setting test
Manhole Cover Fill Cap	Pressure setting test
Product Piping	Leak test, Pressure test
Vapor Piping	Leak test, Pressure test

Notes:

١- Load/Unload adapters are compatible with and open completely when connected to a standard ١٠١,٤ mm (٤") loading arm coupler (comply with SASO Standards*).

٢- Vapor adapter open completely when connected to a vapor coupler.

٣- The optic probe and the ground bolt connections are tested and verified functional utilizing a standard optic system-testing device (Scully tester or equivalent)

٣,٧ Tank Shell Pressure Test

After completion of bottom loading modifications, the tank shell shall be either tested by air pressure or hydro-tested by sweet water for leaks and pressure sustaining capability.

Pressure Gauges: Gauges used for pressure testing shall be of ١٠ mb (٠,١٤٥ psi) division with the test pressure falling in the range between ٥٠٪ to ٧٥٪ of the full scale deflection of the gauge. All pressure gauges shall be calibrated

* To follow API RP ١٠٠٤ Specifications (American Petroleum Institute) until the approval of Saudi standards

٣,٧,١ Method for testing single compartment tank truck:

The tank shell shall be thoroughly cleaned and drained of all dangerous and flammable product and residues prior to testing. Tank shell shall be rendered completely gas free prior to the commencement of test.

The following procedure shall be used:

٣,٧,١,١ The tank shell shall be supported adequately by a sturdy support under the fifth wheel plate if it is not connected to a tractor. Care should be exercised in providing a support under the fifth wheel area that allows for inspection but is not so concentrated that it damages the cargo tank frame rails. The landing gear should not be relied on for the sole support of the loaded tank shell, but if it is a load bearing type landing gear, it should be used in conjunction with the front-end support.

٣,٧,١,٢ Pressure, vacuum and other operative relief devices shall be clamped plugged or otherwise rendered inoperable. If the vents are removed, a suitable blanking cap with a gasket shall be used to close the opening. The hose connecting the vapor vent to the vapor piping shall be removed at the vapor vent.

٣,٧,١,٣ If water is used, it shall be sweet and uncontaminated water. The temperature of the water shall not exceed٣٧,٨ °C (١٠٠ °F). The tank shell shall be filled completely with water. All efforts shall be made to remove any entrapped air. The test equipment shall be connected and the pressure applied gradually to ٢١٠ mb (٣ psig).

٣,٧,١,٤ If air pressure used, it shall be coated with solution of soap and water, heavy oil, or other material suitable for the purpose, foaming or bubbling of which indicates the presence of leaks.

٣,٧,١,٥ Pressure shall be introduced through a bottom fitting or alternatively, through a top fitting, however, the test pressure must be measured at the top of the tank. A second gauge at the pressure inlet source will be useful in raising the tank test pressure without climbing on top of the tank. Pressurizing the tank shell from ground level through a bottom fitting is desirable from a safety and convenience standpoint.

٣,٧,١,٦ Valve shall be provided downstream the pressure control valve to dump accidental overpressure.

٣,٧,١,٧ The tank shell shall remain under pressure for a period of at least ١٠ minutes. After this period has elapsed, a check of all fittings, outlet piping and joints shall be made. The pressure gauge / manometer shall be checked to ensure that no pressure drop has occurred. Any loss of pressure or observed leakage shall constitute a test failure.

٣,٧,١,٨ By either testing methods mentioned above, testing shall be repeated following any alterations or repairs that involve tank integrity. If there is any leakage, undue distortion, or if failure impends or occurs, the tank truck shall

not be placed in service unless an adequate repair is made. The adequacy of the repair shall be determined by the same method of test.

٣,٧,١,٩ The tank shell shall be completely drained and rendered free of water prior after completion of test.

٣,٧,١,١٠ Fuel Tankers in jet fuel applications shall be tested using pneumatic method only.

٣,٨ Tanker Certification

٣,٨,١ The TPIC shall assign a unique bar code (a string of alpha-numeric characters) to every fuel tanker modified to bottom loading and inspected and certified by the TPIC. The bar code shall also be recorded on an Aluminum Plate and affixed to the tank shell along with information relating to the tank truck volumetric capacity, the fifth wheel height and type of tractor head conforming to the fifth wheel height.

٣,٨,٢ The TPIC shall maintain a database for all inspection records and associate these with the unique bar code for every tank truck. The database shall include the expiration date of the first or initial inspection and the date of tank shell hydro-test. The database shall be in a format suitable for electronic transfer to the Terminal Management System (TMS).

٣,٨,٣ A test report shall be jointly completed by the TPIC and workshop for every tank truck that is modified. Data shall be recorded for all tests conducted. The report shall include the test date, information regarding the owner and the operating location of the tank truck, the serial number of the tank truck, bar code and the type of test conducted.

٣,٨,٤ The TPIC shall provide an Inspection Certificate for first time inspection for each tank truck modified to bottom loading. The Inspection Certificate shall be similar in format to the one shown in Appendix ٦.

٤. PERIODIC MAINTENANCE INSPECTION

١. General

Mandatory Periodic Maintenance Work and Inspection shall be performed on modified tank trucks after a maximum ٦ months from the date tank truck is put into service, and continued on a semi- annual basis thereafter (see table below).

٢. Specific work description:

٤,٢,١ Product Loading / Un-Loading System

ITEM	DESCRIPTION OF SERVICE
٤,٢,١,١ Loading Adapter	Check for functionality using a loading arm coupler connection. Check the adapter face-plate for wear, abrasion and damage. Check poppet travel. Inspect and replace damaged seals, O-rings and gaskets if leak is discovered, otherwise replace as per supplier Service Manual after initial inspection. Check sight glass for cleanliness. Clean and / or replace as required.
٤,٢,١,٢ Load / Unload Adapter	Same as for Loading Adapter. Additionally, inspect and check the operating handle function for proper opening and closure.
٤,٢,١,٣ Emergency Valves	Check for functionality (using the operating mechanism of OPTION I or OPTION II Configuration as applicable). Perform undercarriage inspection for visible damage, loose connections and or corroded parts. Apply silicone sealant at connection points as required. Inspect and replace damaged seals, O-rings and gaskets if leak is discovered, otherwise replace as per supplier Service Manual after initial inspection.
٤,٢,١,٤ Product Piping	Check undercarriage piping and flanges for integrity. Check condition of structural supports and perform repair work if required. Check bolted flanged connection for integrity. Inspect and replace damaged seals, O-rings and gaskets if leak is discovered, otherwise replace as per supplier Service Manual after initial inspection.

٤,٢,٢ Vapor Venting System

ITEM	DESCRIPTION OF SERVICE
٤,٢,٢,١ Vapor Vent Valve	OPTION I Configuration: Check vapor vent valve for complete opening and closure for pneumatic operation. Check gaskets and disc seals and replace if found damaged, otherwise replace as per supplier Service Manual after initial inspection. OPTION II Configuration: Check vapor vent valve for complete opening and closure simultaneous with the Emergency Valve. Check poppet travel. Check gaskets, disc seals and replace if found damaged. Otherwise replace as per supplier Service Manual after initial inspection. Strip and grease the fittings as required.
٤,٢,٢,٢ Flexible Hose	Check the flexible vapor hose connection for damage and / or distortion and leaks. Check clamps for tightness.
٤,٢,٢,٣ Vapor Adapter	Check for functionality using a vapor coupler connection. Check the adapter face-plate for wear, abrasion and damage. Check poppet travel. Inspect and replace damaged seals, O-rings and gaskets if leak is discovered, otherwise replace as per supplier Service Manual after initial inspection. Check sight glass for cleanliness. Clean and / or replace as required.
٤,٢,٢,٤ Vapor Piping	Check vapor piping for damage. Check bolted flange connections for tightness. Check shell reinforcement pads (OPTION I Configuration) for corrosion or rust damage at vapor pipe penetrations through the shell.

٤,٢,٣ MANHOLE COVER & EMERGENCY VENTING SYSTEM

ITEM	DESCRIPTION OF SERVICE
٤,٢,٣,١ Pressure/ Vacuum Vents	Remove and thoroughly clean the vent by removing trapped dust and foreign material. Replace gaskets as required. Check for operability under ٧٠ mb pressure and ٢٠ mb vacuum settings. Replace defective vent with new vent if required.
٤,٢,٣,٢ Manhole Cover	Check manhole cover neck ring for damage, seal tightness, rust and / or corrosion.
٤,٢,٣,٣ Fill cap	Check the fill cap base spring mechanism for functionality as a pressure relief and emergency venting device. Check seal for leaks. Check the fill cap cover arm for damage, loose connection and operability.

٤,٢,٤ Overfill Prevention & Grounding System

ITEM	DESCRIPTION OF SERVICE
٤,٢,٤,١ Optic Sensor	Check for functionality using a Scully (or equivalent) tester. Check housing for loose or damaged connections and replace as required. Apply silicone sealant at connection points as required.
٤,٢,٤,٢ Ground Bolt	Check installation surface for corrosion damage and the pointed tip of the bolt for damage. Check the installation for tightness. Apply silicone sealant around the top of the bolt (wire side) where the hex nut meets the shell / chassis structure.
٤,٢,٤,٣ Wiring	Inspect and check the wiring size (Minimum acceptable is #١٠ AWG). Check wiring path for damage, Check for proper tightening of wire around the compression fittings on the optic sensor, ground bolt and socket housing.
٤,٢,٤,٤ Optic Socket	Check socket pins for damage and cleanliness. Check socket housing for installation tightness. Apply silicone sealant at connection points as required.
٤,٢,٤,٥ Functionality	Check for system functionality using a Scully (or equivalent) tester. Additionally, perform an electrical continuity test between the Ground Bolt connection point at the tank and Grounding Pin at the Optic socket. Using a low-resistance ohm-meter, verify that the circuit resistance does not exceed ١٠ ohms.

٤,٢,٥ PNEUMATIC SYSTEM (OPTION I CONFIGURATION)

ITEM	DESCRIPTION OF SERVICE
٤,٢.٥,١ Pneumatic circuit airlines and hoses.	Check for leaks using a water / soap spray. Check for kinks and damage. Replace damage parts.
٤,٢,٥,٢ FRL Unit	Check filter bowl and drain any accumulated condensate liquid. Replenish with the lubricant as required and check air pressure setting as per supplier manual and instructions.
٤,٢,٥,٣ Air Intake Valve	Check valve operability to ensure air supply to FRL valve.
٤,٢,٥,٤ Air Interlock valve	Check for functionality (activation of air interlock valve via a guard bar mechanism or loading arm coupler connection). Check if the brakes of the truck are applied by trying to drive away with air interlock in activated position.
٤,٢,٥,٥ Opening and closure of bottom loading fittings.	Check opening of emergency valves and vapor vent valve by opening the manhole cover fill cap to ensure these open correctly.

٤,٢,٦ MECHANICAL SYSTEM (OPTION II CONFIGURATION)

ITEM	DESCRIPTION OF SERVICE
٤,٢,٦,١ Bottom Operator	Check the operating handle for ease of movement. Check the bottom operator assembly for signs of damage, rust and / or corrosion. Grease the components as required.
٤,٢,٦,٢ Cable assembly	Check the cable assembly (connecting bottom operator to emergency valve cam bracket) for slackness and damage. Adjust cable tension to ensure full opening of the emergency valve. Grease the moving parts in accordance with instructions in the supplier manual.
٤,٢,٦,٣ Vapor vent rod assembly	Check the alignment to ensure the vapor vent push rod stem and emergency valve rod adapter are in line in vertical plane. Adjust as required in accordance with the supplier instruction manual.

٤,٢,٧ HOUSE KEEPING BOX

ITEM	DESCRIPTION OF SERVICE
٤,٢,٧,١ Box frame	Check box frame for structural integrity and dents / damage during road transportation. Repair as required.
٤,٢,٧,٢ Box lid	Check the box lid for operability. Check hinges, latches and support hooks for integrity. Ensure the box lid frame is provided with a protective rubber seal around it. Replace damaged seal as required.
٤,٢,٧.٣ Dust cap and chain on API fittings	Check dust caps and chain for API fittings in the box for integrity. Replace damaged or missing parts as required.

٤,٣ Periodic Maintenance Sticker

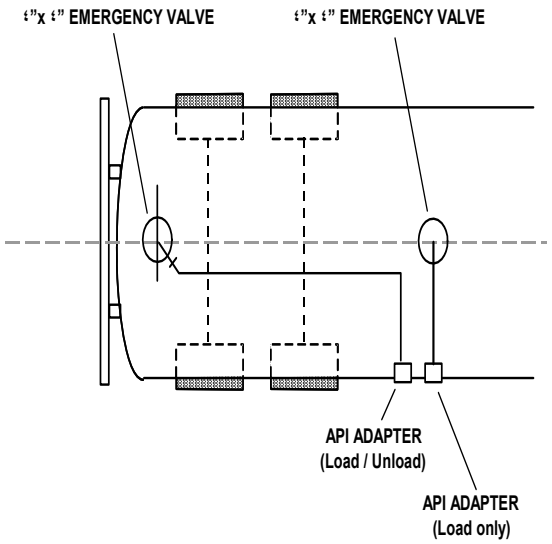
After successful Periodic Maintenance check of the tank truck, the TPIC / workshop shall issue a sticker indicating the issue date, the expiration dates and the bar code of the tanker. The sticker shall be affixed at a prominent location on the body of the tank shell. Tank trucks failing to pass the Periodic Maintenance inspection shall be taken out of service pending repairs and TPIC / workshop certification of satisfactory compliance.

٥. FREQUENCY OF INSPECTIONS AND PERIODIC MAINTENANCE TESTS

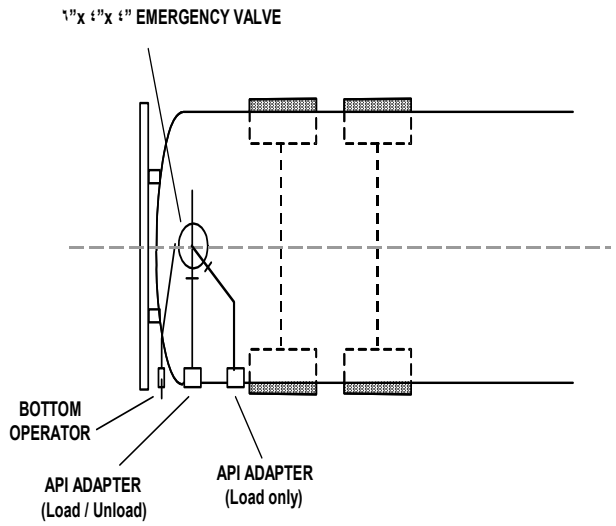
Item No.	Item description	Frequency
١	Initial inspection	When ever a modification done to the tanker truck
٢	External Inspection	٦ month
٣	PM inspection	٦ month
٤	Service Of BL(bottom loading) / VR (vent relieving) Fittings	Yearly (See Note)
٥	Certification / Sticker	٦ month
٦	Internal Inspection	Three Years
٧	Hydrostatic test	Three Years

Note: Seals, Gaskets and O-rings shall be replaced at minimum interval specified in the Supplier Service Manual or in the event of leaks or damage, which ever occurs first.

APPENDIX ١



OPTION I
(PNEUMATIC SYSTEM)

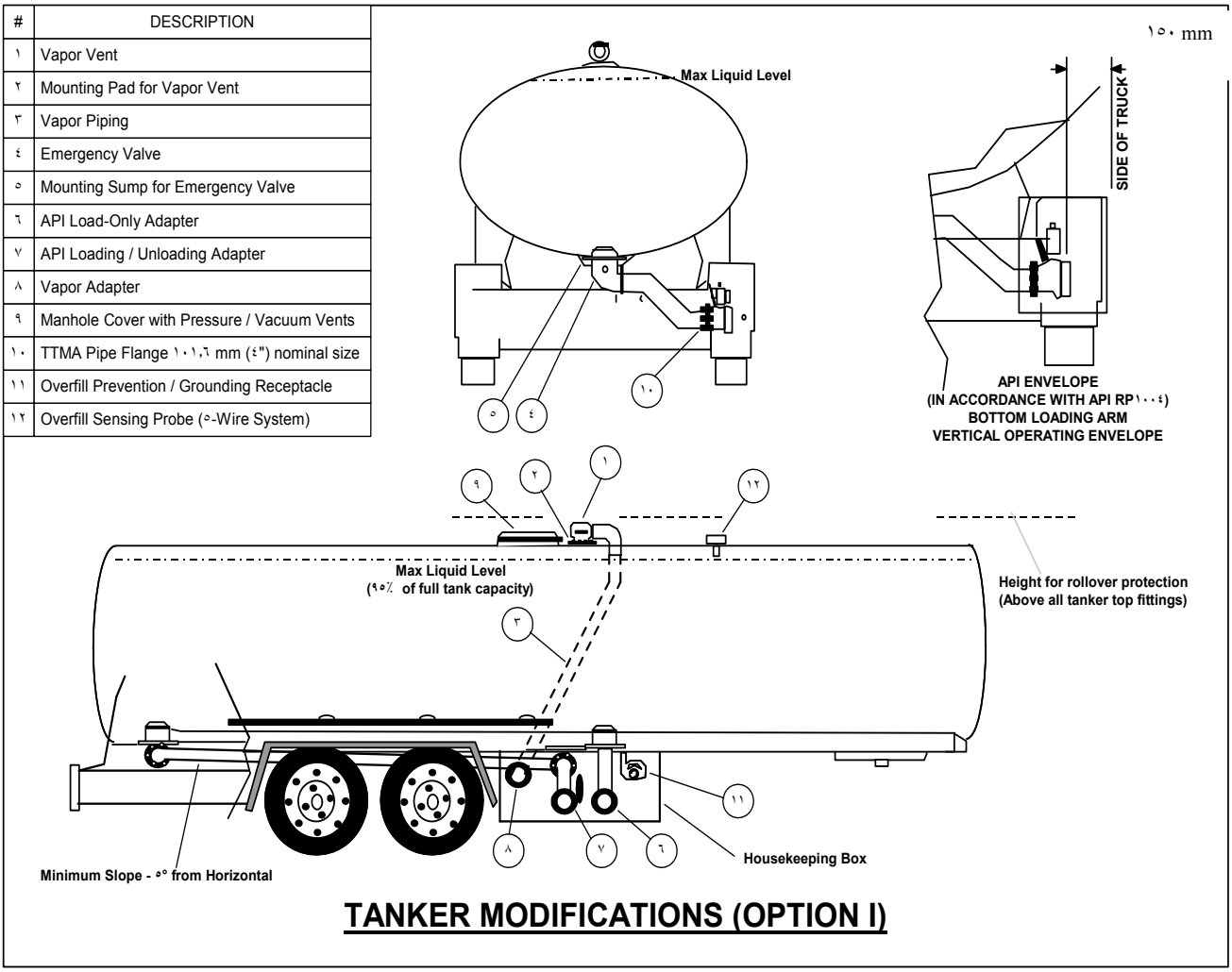


OPTION II
(MECHANICAL SYSTEM)

PIPING & EMERGENCY VALVE (EV) CONFIGURATIONS

APPENDIX ٢

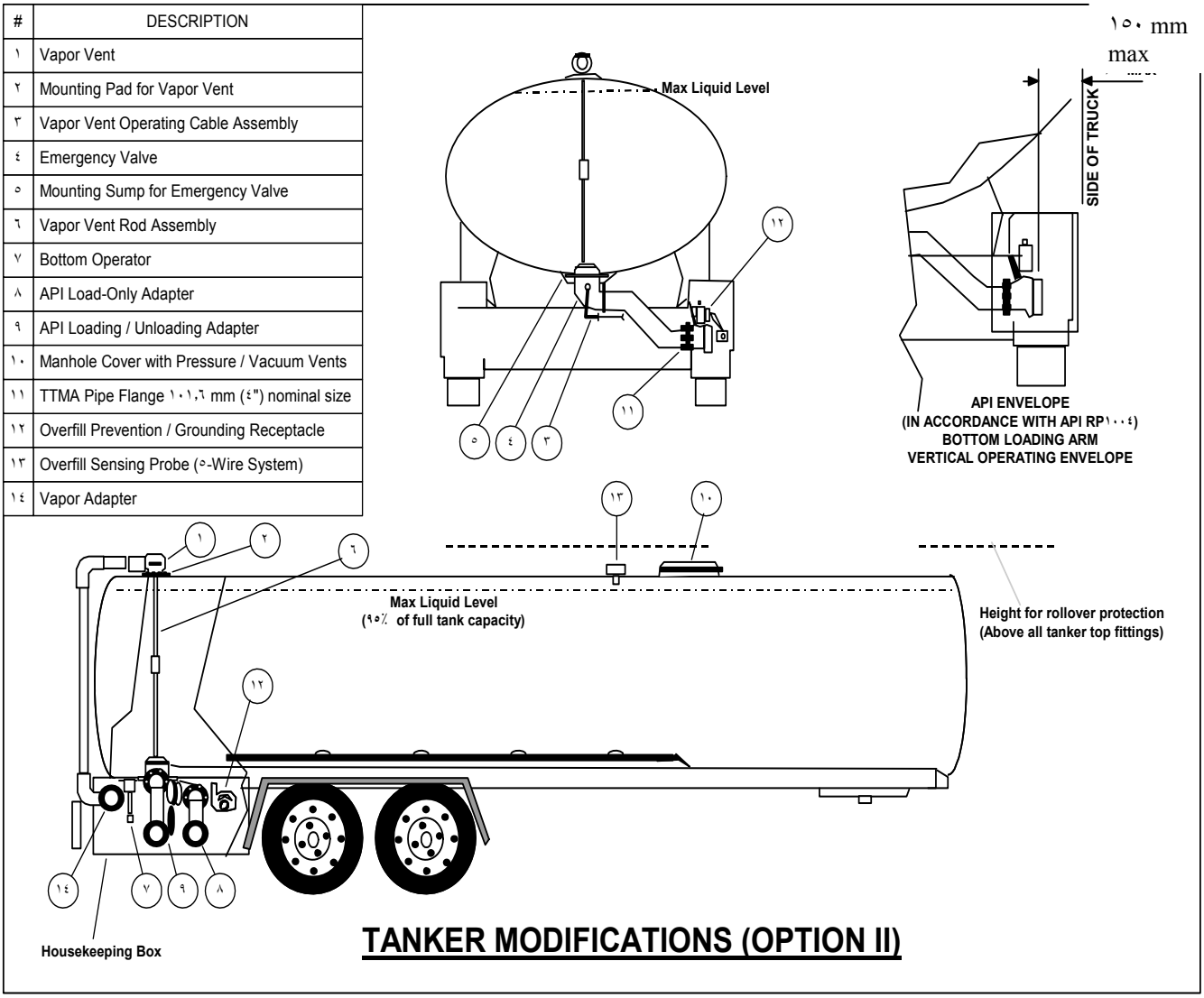
#	DESCRIPTION
١	Vapor Vent
٢	Mounting Pad for Vapor Vent
٣	Vapor Piping
٤	Emergency Valve
٥	Mounting Sump for Emergency Valve
٦	API Load-Only Adapter
٧	API Loading / Unloading Adapter
٨	Vapor Adapter
٩	Manhole Cover with Pressure / Vacuum Vents
١٠	TTMA Pipe Flange ١٠١,٦ mm (٤") nominal size
١١	Overfill Prevention / Grounding Receptacle
١٢	Overfill Sensing Probe (٥-Wire System)



TANKER MODIFICATIONS (OPTION I)

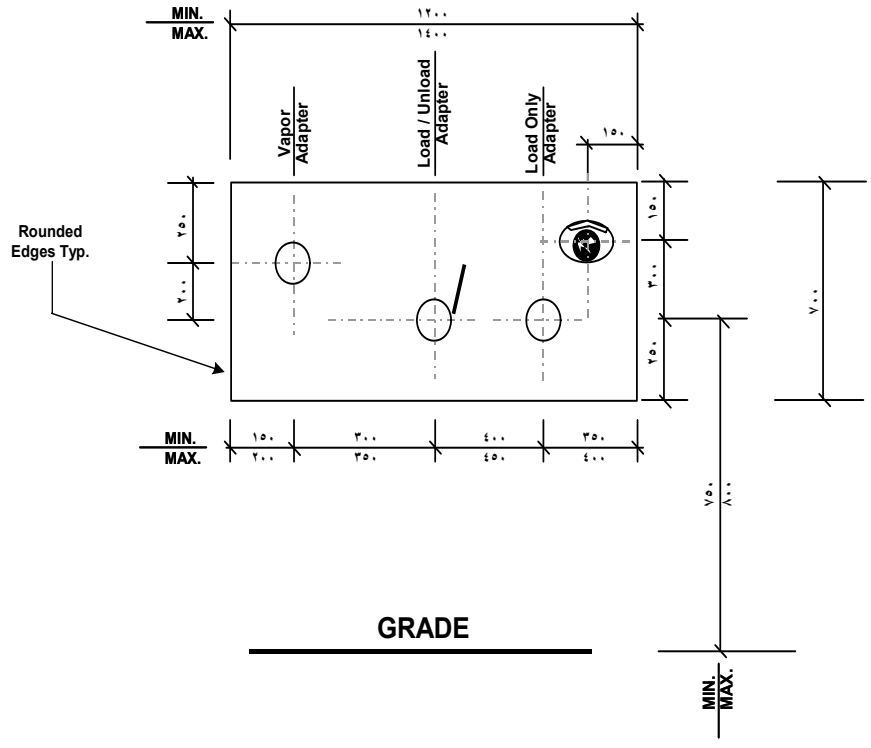
APPENDIX ٣

#	DESCRIPTION
١	Vapor Vent
٢	Mounting Pad for Vapor Vent
٣	Vapor Vent Operating Cable Assembly
٤	Emergency Valve
٥	Mounting Sump for Emergency Valve
٦	Vapor Vent Rod Assembly
٧	Bottom Operator
٨	API Load-Only Adapter
٩	API Loading / Unloading Adapter
١٠	Manhole Cover with Pressure / Vacuum Vents
١١	TTMA Pipe Flange ١٠١,٦ mm (٤") nominal size
١٢	Overfill Prevention / Grounding Receptacle
١٣	Overfill Sensing Probe (٥-Wire System)
١٤	Vapor Adapter



TANKER MODIFICATIONS (OPTION II)

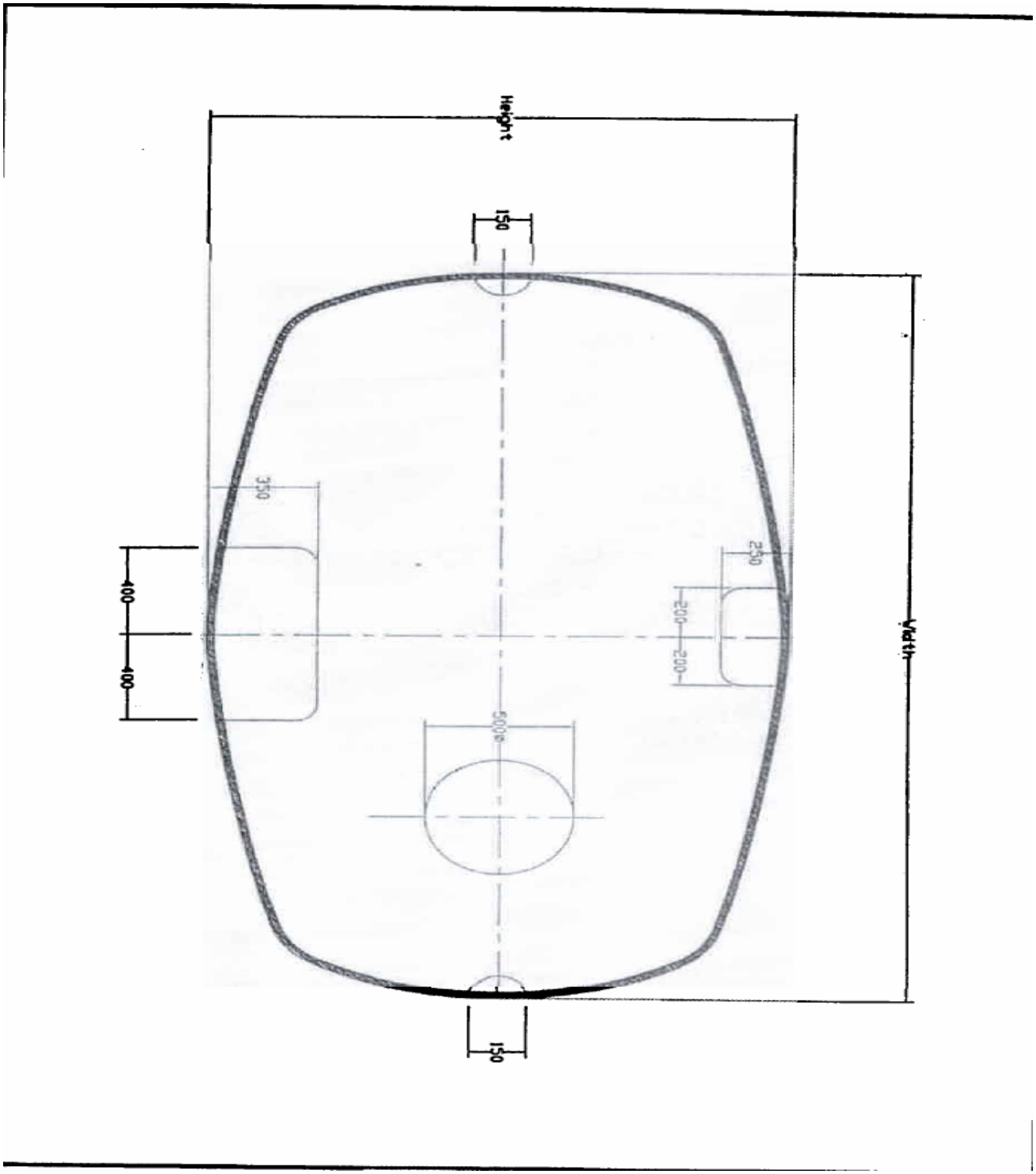
APPENDIX ٤



NOTE: PNEUMATIC FITTINGS / CONNECTIONS AND HINGED FAUCET GUARD BAR NOT SHOWN FOR CLARITY

RECOMMENDED ARRANGEMENT OF ADAPTERS IN HOUSEKEEPING BOX (UNLADEN CONDITION)
(ALL DIMENSIONS IN MILLIMETERS)

Appendix ٥



Appendix ٦

Company Name In English	Company logo	Company Name In Arabic

Certificate Serial No.: _____ Tractor Head / Trailer SAP Nos.: _____

Inspection Certificate

THIS CERTIFICATE IS ISSUED TO _____, CONTRACTOR / CUSTOMER NO. _____, UPON COMPLETION OF THE INSPECTION REQUIREMENTS OF THE TANKER WITH SAP NUMBERS AS SHOWN.

THIS TANKER WILL BE EXCLUSIVELY OPERATED WITH TRACTOR HEAD NO. _____, HAVING FIFTH WHEEL HEIGHT OF _____MM (UNLADEN). THE VOLUMETRIC CAPACITY OF TANKER IS _____LITERS.

THIS TANKER WAS INSPECTED & CERTIFIED ON _____. AN INSPECTION STICKER EVERY SIX MONTHS WOULD BE REQUIRED AFTER THIS DATE TO MAINTAIN VALIDITY OF THIS CERTIFICATE.

THE WORKSHOP ASSUMES FULL RESPONSIBILITY FOR ANY DEFECTS IN THE MATERIALS AND WORKMANSHIP FOR BOTTOM LOADING MODIFICATIONS. THE THIRD PARTY INSPECTION CONTRACTOR CERTIFIES THAT THE TANKER SHELL COMPLIES WITH THE BOTTOM LOADING DESIGN REQUIREMENTS.

Work Shop Stamp with Signature	Third Party Inspection Stamp with Signature

Time In:

Appendix ٧: External Inspection Checklist
(Six Monthly Inspection)

Time Out:

Customer / Hauler:	Company ID No.:	Volumetric Capacity (Liters):
Truck No. (SAP):	Trailer No. (SAP):	

Item #	GENERAL VEHICLE INSPECTION	Pass	Fail
١	Government Registration Documents are available and valid MVPI inspection sticker is displayed on the windshield.		
٢	Hood latch is functional and secured adequately.		
٣	External batteries secured in an insulated covered box.		
٤	Electrical wiring is free of bare wires, loose and poorly taped connections,		
٥	Air brake hoses are connected, are in good condition and free of worn spots and leaks. Primary and Parking brakes are functional.		
٦	Headlights, brake lights and signal lights are free of damage and operational.		
٧	Fifth Wheel connection is without rust or corrosion damage & deformation.		
٨	Fifth Wheel assembly bolts are intact (no missing bolts) and free of rust and damage.		
٩	Exhaust system is in good condition.		
١٠	The chassis frame is free of cracks and loose connection bolts. The spring leaves are free of damage and without leaks at shock absorber mountings.		
١١	Tires are in good condition, free of missing chunks and bulging, and with minimum ٢/٣٢ inch (٢ mm) tread depth across the full width.		

١٢	Tire rims are in good condition and without dents or warping. Tire stems do not extend past the rim edge.		
١٣	Side / rear view mirrors are functional and without damage.		
١٤	Windshield is without cracks and is in good condition. Wipers are functional and without worn out blades.		
١٥	Fuel tank is in good condition, free of damage and secured adequately. Fill cap is free of damage and closes the fuel tank properly.		
١٦	Auxiliary fuel tank (If present) is in good condition and equipped with a pressure relief device. The valve in fuel supply line from the auxiliary fuel tank is in closed position.		
١٧	Seat belts in driver cabin are functional and in good condition. Toolbox for minor repairs is available and labeled, and is secured properly in an accessible location.		
١٨	Two - (٢) Portable fire extinguishers properly tagged and sealed, are provided.		
١٩	Tank top access ladder is in good condition and well secured without loose or missing bolts. Ladder rungs, frame and support clips are free of rust and corrosion damage.		
٢٠	The tank top containment curb is in good condition and walkway with skid resistant surface is provided.		
Item #	**EXTERNAL INSPECTION**	**Pass**	**Fail**
	General		
٢١	Tank shell Condition: No shell damage is observed. No signs		
٢٢	Exposed shell and head areas are free of cuts and gouges in excess of ١٠٠ mm in length, and dents in excess of ٢٥ mm in depth.		
٢٣	No signs of leak are observed around tank shell repair work (if present) and at joints between tank shell mountings and tank shell.		
	Emergency Valve		
٢٤	No signs of leak or damage observed at junction between Emergency Valve and tank shell, and Emergency Valve and piping.		

٢٥	Emergency valves are installed squarely on mounting sump without welding distortion and weld encroachment in excess of ٢٠mm.		
	Emergency Valve Operating System		
٢٦	The pneumatic air-supply lines are free of sharp bends and clear of sharp edged mountings and protrusions on the tank truck chassis and shell support structure. (Pneumatic System)		
٢٧	FRL unit Pressure Gauge is set to ٧٠ psig -٧٥ psig.		
٢٨	The Filter Regulator Lubrication (FRL) unit bowl is not more than ¾ full with the condensate liquid. (Pneumatic System).		
٢٩	FRL unit lubrification bowl is full with lubricating oil between the gage marks (Pneumatic System).		
٣٠	The cable path (between the emergency valve cam and the bottom operator) is straight and free of sharp bends. (Mechanical System)		
٣١	Travel distance of bottom operator emergency valve cam is approximately ٦٠ mm to ensure full opening of vapor vent and emergency valve. (Mechanical System)		
	Loading & Unloading Adapters		
٣٢	API adapters are equipped with product level indicator, and with protective caps with chain.		
٣٣	API adapter faceplate is free of damage and aligns with outer rim of adapter. No signs of leak are present at the junction of rim and faceplate.		
٣٤	Operating handle of load / unload adapter is free of damage and opens the adapter fully when operated.		
	Vapor Control System		
٣٥	Vapor adapter is equipped with product level indicator, and protective caps with chain,		
٣٦	Vapor adapter poppet is free of damage, without sign of leak at the outer rim, and aligns with the outer rim of the adapter.		
٣٧	Vapor Vent Valve external surface and mounting plate is free of damage, corrosion and securely bolted in place. Pneumatic air connection is secured in the inlet port and is free of broken or chipped ends.		

٣٨	Flexible connection between vapor vent and vapor piping, if used is equipped with steel wire helix for electrical connectivity and strength.		
	Overfill Prevention & Grounding System		
٣٩	The Optic probe housing is free of damage, corrosion and signs of leak.		
٤٠	Overfill / Grounding socket (installed to the right of load only API adapter in the Housekeeping Box, inspector facing the Housekeeping Box) is provided with protective cap with chain. The connecting pins are clean and free of any sign of surface damage.		
٤١	The ground bolt is secured on the tank truck shell or shell chassis structure frame. The ground bolt is installed on surface free from grease, paint, weld spatter and debris.		
٤٢	Wiring is encased in insulating jacket, free of splits and exposed surface at connection points of the optic probe, socket and ground bolt respectively.		
٤٣	Wiring jacket is routed in metallic conduit outside of the tank shell and is supported by steel clips at the tank shell structure.		
	Manhole Cover & Tank Shell Venting System		
٤٤	**Bolted on Manholes:** Manhole cover base plate has no missing, loose or damaged bolts. Fill cap is in good operating condition, and locking mechanism is functional. Sealing surface of fill cap is without damage. Fill cap gasket is without signs of degradation (swelling or cracking). There is no evidence of leak, corrosion or damage at junction of Manhole assembly and weld collar. - Manholes with Clamp Ring: Same as for bolted manholes. Additionally, check that the clamp ring is installed snug tight and the clamp ring attachment bolt is tightened to ١٥٠ in-lb torque (verified by a handheld torque tester).		
٤٥	The Pressure / Vacuum vent assembly appears clean and has a valid certification of replacement after ١٢ month interval.		
٤٦	Manhole enclosure box (if provided) has openings (meshed cover or round openings at sides) to allow for venting through Pressure / Vacuum vent and Pressure Actuated Fill (PAF) Cap.		
٤٧	The Tank Shell INTERIOR is free of residual product (Verify using an Explosion Proof source of light).		

	Piping Work		
٤٨	Piping is free of damage, corrosion and sign of leaks. Bolted joints are without missing bolts. Bolts appear properly tightened. Welded joints have smooth surface and are free of crack, incomplete fusion or damage.		
٤٩	Piping is supported structurally by the tank shell structure and not by bottom Emergency Valves and loading / vapor adapters.		
٥٠	No mitered bends are present in the product and vapor piping. Standard elbow fittings are used at bends and changes in path of the piping.		
٥١	Piping from emergency valve(s) to loading Adapters is provided with nominal slope to facilitate the flow of product to the adapter(s).		
	Housekeeping Box:		
٥٢	Based upon visual examination, welded joints are free from cracks, and structural defects. Weld surfaces are smooth and free of sharp edges and discontinuities.		
٥٣	The bottom loading adapters, vapor adapter and overfill prevention / grounding socket fittings are housed in a lockable housekeeping box constructed of steel as shown in Appendix ٤.		
٥٤	Protective caps are provided for vapor adapter, loading / unloading adapters and overfill prevention / grounding socket.		
٥٥	Minimum vertical clearance of ٥٠٠ mm (tanker in unladen condition) is provided from the underside of the housekeeping box to Grade.		
٥٦	No part of the housekeeping box interferes with or prevents connection to the loading / unloading adapters, vapor adapter and overfill prevention receptacle.		

٥٧	The bottom operator as shown in Appendix ٣ in its installed position does not interfere with other bottom loading fitting connections in the housekeeping box.		
٥٨	Horizontal spacing between centerlines of the two adapters (comply with SASO Standards*), is ٤٠٠ mm (min.) to ٤٥٠ mm (max.).		
٥٩	The face of the API adapters is located at a distance of ١٥٠ mm inwards from the side of the tank truck.		
٦٠	The centerline height of the adapters(comply with SASO Standards*), (empty tank shell condition) is ٧٥٠ mm (min.) to ٨٠٠ mm (max.) from grade level		
٦١	Centerline of vapor adapter is at a horizontal distance of ٣٠٠ mm (min.) to ٣٥٠ mm (max.) from the adjacent adapter(comply with SASO Standards*), and at a height of ٢٠٠ mm from the horizontal centerline of the API adapters.		
	Welding		
٦٢	Based upon visual examination, welded joints are free from cracks, and structural defects. Weld surfaces are smooth and free of sharp edges and discontinuities.		
	Functionality Checks		
٦٣	The load / unload API adapters engage properly without a gap and disengage without getting stuck, when coupled with a loading arm coupler.		
٦٤	The vapor adapter engages properly without a gap and and disengage without getting stuck, when coupled with a vapor coupler.		

٦٥	Vapor vent valve opens completely (approximate opening size = ٧٠mm) by activating the pneumatic control (push button, lifting of guard bar or pressing the air interlock valve mounted on load / unload adapter (comply with SASO Standards*), and feeling by hand via Manhole cover opening the opening of valve). Also, see Note ٢ on Page ٥. Note: This is applicable only to tank trucks equipped with pneumatic system. Air supply must be activated by starting engine prior to test.		
٦٦	Lifting of Guard bar assembly / loading arm coupler connection or push button control activates the air interlock (sound of air escaping to brakes is heard for few seconds only), opens the vapor vent valve, and applies the vehicle brakes on (check by attempting to drive away) Note: This is applicable only to tank trucks equipped with pneumatic system.		
٦٧	The Overfill / Grounding system is verified by an Optic System Tester Unit for functionality.		

Notes on Functionality Checks:

١) Item Nos. ٦٣ and ٦٤ - This will require a test stand comprising of a loading arm and a vapor arm.

٢) Item No. ٦٥ - Vapor vent functionality should be verified by opening the PAF Cover slowly to release any pressure, and feeling by hand the inward opening of vent bottom seat. The opening size is approximately ٧٠ mm. The inspector is required to wear protective mask to avoid vapor inhalation. Also, see ٤) below.

٣) Item No. ٦٧ - Overfill / Grounding system should be verified using a commercially available Optic Overfill System Tester unit.

٤) General - Inspection of Manhole Cover & Tank Truck Venting System will require access to the top of the tank truck. The inspection contractor should use a mobile ladder platform with safety rails to ensure safety during inspections on the roof of the tanker. The tank truck shell shall be emptied of product prior to conducting the inspections.

Acceptable Results Of Inspection:

١. Dents, cuts, digs and gouges:

a. For dents at welds or in an area that include a weld, the maximum allowable depth is ١٣ mm (½ inch).

b. For dents away from welds, the maximum allowable depth is ١/١٠ of the largest dimension of the dent, but in no case the depth shall exceed ٢٥ mm (one inch).

٢. Weld or structural defects:

All structural welds are free of defects such as visually noticeable cracks, pinholes, incomplete fusion or discontinuity. Road tankers displaying weld structural defects shall be taken out of service until repairs and re-inspection for satisfactory workmanship of repair work is performed.

٣. Leakage:

No signs of leak are evident around bottom loading / vapor recovery fittings, piping and joints between piping and bottom loading / vapor recovery fittings. All sources of leakage shall be properly repaired prior to returning road tanker to service.

٤. Pressure Relief System:

a. Pressure / Vacuum (P/V) valve is free of surface deposit and appear clean. Inspection requires unscrewing the housing cap and taking the P / V Valve out. P/V valve that appear corroded, damaged or plugged with dirt or grime shall be replaced prior to returning road tanker to service.

b. PAF cap is free of damage, the fill cap opens fully, and the locking mechanism is functional. Seal is free of damage and provides complete closure.

Inspector Name (Print):	**Inspector Signature:**	**Inspector Badge / ID No.:**	**Date:**

Appendix ٨

Appendix ٨ : Tank Shell Three Year Internal Inspection Check List

Customer / Hauler: _____
Date of Shell Manufacture:_____
Date modified to Bottom Loading: _____
Tank Shell Calibrated Capacity (Liters): _____
Fifth Wheel Height (Meters) : _____

Inspection Date: _____
Trailer Registration No.: _____
SAP No. : _____
Test Pressure (If available): _____
Bottom Loading Equipment Supplier :_____

WARNING: PRIOR TO ENTERING TANK, ENSURE THE INTERIOR IS FREE OF FLAMMABLE VAPORS AND HAS SAFE LEVEL OF OXYGEN PRESENT. COMPLY WITH THE INDUSTRY AND REGULATORY REQUIREMENTS FOR WORK IN CONFINED SPACES.

ITEM	INSPECTION REQUIREMENTS	COMPLIANCE	CORRECTIVE ACTION IF FAIL	REMARKS
١) Shell Cleanliness	**Inspect and ensure that the tank shell interior is clean of sludge, debris and any foreign material that can cause product contamination.**	**Pass** ☐ **Fail** ☐	**Cleaning Required** ☐	_____ _____
٢) Shell Condition (Interior)	**Check for corrosion, dents, cracking, pitting or distortion at manhole area, around emergency bottom inlet valves, sumps and joints throughout tank. Look for discoloration and bleeding, check entire shell for deformation.**	**Pass** ☐ **Fail** ☐	**Repair Required** ☐ **Cleaning Required** ☐	_____ _____ _____
٣) Welds	**Inspect welds in tank, making hand contact to ensure that sharp edges and gaps are not present. Inspect thoroughly the bulk head and baffle welds and the welds in the area above fifth wheel upper coupler. Check if the weld surface is smooth.**	**Pass** ☐ **Fail** ☐	**Repair Required** ☐ **Cleaning Required** ☐	_____ _____ _____
٤) Baffles	**Inspect Baffles for Product flow opening at bottom, vapor flow opening at top and access opening in the centre. Recommended openings are shown in Appendix ٥.**	**Pass** ☐ **Fail** ☐	**Enlargement of Openings Required** ☐	_____ _____ _____
٥) Spark Promoters	**Inspect to ensure that conductive devices such as gauging rods, metal clips, weld plates, brackets, which can act as spark promoters are not present inside the tank shell.**	**Pass** ☐ **Fail** ☐	**Repair Required** ☐ **Cleaning Required** ☐ .	_____ _____ _____
٦) Vapor Vent, Overfill Sensor & Emergency Valve	**Check installation, inspect visually for damage. Inspect internal vapor line for damage and weld joint with shell for gaps, surface imperfections and smoothness.**	**Pass** ☐ **Fail** ☐	**Repair Required** ☐ **Cleaning Required** ☐	_____ _____ _____
٧) Hydrotest	**Fill tank shell with clean water. Apply ٣ psig pressure and inspect entire tank shell including seams and joints for leaks. PAF cap and P/V vent need to be removed prior to performing hydro test .**	**Pass** ☐ **Fail** ☐	**Repair Required** ☐ **Cleaning Required** ☐	_____ _____ _____
٨) General	**Remove all equipment brought into tank, then inspect again before leaving the tank.**	**Pass** ☐ **Fail** ☐	**Cleaning Required** ☐	_____ _____

Inspection Company Certification:

Name _____
Signed _____
Date _____

Tank Truck Owner or Representative:

Name _____
Signed _____
Date _____

Disposition of Tank Truck:

Return to Service ☐
Remove from Service ☐

REFERENCE CODES AND STANDARDS

The following codes, standards are used to develop this standard.

- **AMERICAN PETROLEUM INSTITUTE (API)**

API RP ١٠٠٤	Bottom Loading and Vapor Recovery for MC - ٣٠٦ Tank Motor Vehicles
API Publication ٢٠١٣	Cleaning Mobile Tanks in Flammable or Combustible Liquid Service
API Publication ٢٢١٧	Guidelines for Confined Space Work in the Petroleum Industry
API RP٢٠٠٣	Protection against Ignitions arising out of Static, Lightning and Stray Currents

- **AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)**

ASME V	Non-destructive Examination (NDE)
ASME VIII	Pressure Vessels
ASME IX	Welding Qualifications

- **AMERICAN WELDING SOCIETY (AWS)**

ANSI / AWS F٤,١-٩٤	Recommended Safe practices for the Preparation for welding and cutting of containers and Piping
AWS D١,١	Structural Welding Code - Steel

- **NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)**

NFPA ٤٩	Hazardous Chemicals Data
NFPA ٧٠	National Electrical Code
NFPA ٧٧	Recommended Practice on Static Electricity
NFPA ٣٢٥M	Fire Hazard Properties of Flammable Liquids, Gases and Volatile Solids
NFPA ٣٨٥	Tank Vehicles for Flammable and Combustible Liquids

- **SAUDI ARABIAN STANDARDS ORGANIZATION (SASO)**

SASO SSA١٢٨٥	Transportation of Dangerous Substances by Road - General Safety Requirements
SASO SSA١٢٨٧	Transportation of Dangerous Substances by Road - Petroleum Liquids
SASO SSA٢٢٨٨	Truck design standard